

Introducing, Installing, and Upgrading Windows 7

LESSON

1

EXAM OBJECTIVE MATRIX

SKILLS/CONCEPTS	MTA EXAM OBJECTIVE DESCRIPTION	MTA EXAM OBJECTIVE NUMBER
Identifying Windows Operating System Editions	Identify Windows operating system editions.	2.1
Identifying Upgrade Paths	Identify upgrade paths.	2.2
	Identify Windows operating system editions.	2.1
Identifying Application Compatibility	Identify upgrade paths.	2.2
Understanding Product Identification Keys	Understand installation types.	2.3
Understanding Installation Types	Understand installation types.	2.3

KEY TERMS

32-bit computer

64-bit computer

activation

application compatibility

CD key

cloud

custom installation

High Touch Installation (HTI)

image

Lite Touch Installation (LTI)

product key

upgrade installation

upgrade path

Windows 7

Windows 7 Enterprise

Windows 7 Home Basic

Windows 7 Home Premium

Windows 7 Professional

Windows 7 Starter

Windows 7 Ultimate

Windows 7 Upgrade Advisor

Windows Deployment Services

Window Easy Transfer

Zero Touch Installation (ZTI)

You work as an IT technician for Interstate Snacks, Inc., a mid-market food service and vending company. Management has decided to standardize on Windows 7 Professional and has asked your IT group to evaluate all existing computers to determine if they can support the operating system. Any newly acquired computers should have Windows 7 Professional installed. You need to learn as much as possible about Windows 7 system requirements, types of installations, and upgrade paths.

■ Identifying Windows Operating System Editions



THE BOTTOM LINE

Windows 7 is the latest Windows client operating system by Microsoft. This operating system runs on desktop computers, workstations, laptops, and other computers. It was preceded by Microsoft Windows Vista and, before that, Windows XP.

Windows 7 is a desktop operating system and is an improvement over both Windows Vista and Windows XP in many ways: it's faster and easier to install and set up, it's more stable, it has improved Start menu search functionality, and lots more. Windows 7 includes some terrific new features as well, such as large and animated task thumbnails, homegroups, Jump Lists, libraries, and Windows XP Mode, all of which you'll learn about in this course.

If you've used Windows Vista, the Windows 7 interface should seem highly familiar. However, it's a big leap from Windows XP to Windows 7.

Regardless of your experience with Windows operating systems, one thing hasn't changed—Microsoft offers a variety of editions to serve the needs of different users and markets.

The following are the six main editions of Windows 7:

- Windows 7 Starter
- Windows 7 Home Basic
- Windows 7 Home Premium
- Windows 7 Professional
- Windows 7 Enterprise
- Windows 7 Ultimate

There are some common threads throughout all editions. For example, every edition contains the same integrated applications, such as Network and Sharing Center, Control Panel, and Windows Media Player. The different editions also include many of the same multimedia features. All editions support 32-bit systems, and all editions except Windows 7 Starter support 64-bit systems. (You'll learn about 32-bit and 64-bit systems later in the lesson.)

Of the six editions, only Home Premium, Professional, and Ultimate are widely available in the retail sector. The other editions are designed for certain types of computers or markets, or specifically for enterprise use.

Starter is a low-cost edition designed for small notebook PCs such as netbooks. Home Basic is sold in emerging markets (such as China, Mexico, and Russia), but not in the United States or Canada. Home Premium emphasizes the multimedia experience and is geared toward home users, students, and small office/home office (SOHO) users. The Professional and Enterprise editions include additional security features and are designed to meet the needs of the business sector. Professional is recommended for small businesses, and Enterprise is recommended for mid- and large-sized businesses. Ultimate includes all of the features offered in Windows 7.

+ MORE INFORMATION

For more information about Windows 7 and its various editions, visit <http://windows.microsoft.com/en-US/windows7/products/home> and <http://windows.microsoft.com/en-US/windows7/products/compare>

Windows 7 Home Premium, Professional, and Ultimate

The most commonly used Windows 7 editions are Home Premium, Professional, and Ultimate. In this section, you'll learn about the key differences between these popular operating systems.

TAKE NOTE *

A “domain” is a collection of user and computer accounts that are grouped together to enable centralized management and to apply security. Small Windows environments might use workgroups rather than domains. You'll learn about workgroups, domains, and other networking topics in Lesson 4.

All Windows 7 editions are based on a foundational feature set, and each edition includes some unique features. The following are descriptions of the most common retail editions of Windows 7:

- **Windows 7 Home Premium** contains features aimed at the home market segment, such as Windows Aero, Windows Media Center, Remote Media Streaming, Internet TV, Backup and Restore, and multi-touch support. This edition provides adequate networking and security features to be useful in small office environments.
- **Windows 7 Professional** is targeted mainly toward small business users but appeals to power users as well. It includes all the features of Windows 7 Home Premium and adds the ability to join a Windows domain. Additional features include location-aware printing, acting as a Remote Desktop host (especially useful for tech support), Encrypting File System, and Windows XP Mode.
- **Windows 7 Ultimate** contains all of the same features as Windows 7 Home Premium and Windows 7 Professional, but also includes the applications BitLocker and AppLocker (which are advanced security features). Home Premium and Professional users may upgrade to Ultimate for a fee using Windows Anytime Upgrade.

Table 1-1 compares some features of Windows 7 Home Premium, Professional, and Ultimate.

Table 1-1

Comparing a Subset of Features of Windows 7 Home Premium, Professional, and Ultimate

WINDOWS 7 FEATURE	HOME PREMIUM	PROFESSIONAL	ULTIMATE
Aero interface	Yes	Yes	Yes
Windows Media Center	Yes	Yes	Yes
Backup and Restore	Yes	Yes	Yes
Windows Anytime Upgrade	Yes	Yes	No
Back up to network	No	Yes	Yes
Location-aware printing	No	Yes	Yes
Remote Desktop Host	No	Yes	Yes
Encrypting File System	No	Yes	Yes
Windows XP Mode	No	Yes	Yes
Support for joining domains	No	Yes	Yes
BitLocker and AppLocker	No	No	Yes

Other Windows 7 Editions: Starter, Home Basic, and Enterprise

Some Windows 7 editions—Windows 7 Starter, Home Basic, and Enterprise—don't have a large retail presence for a variety of reasons. These include limited functionality, geographical restrictions, or a focus on larger business environments.

You won't find the following Windows editions on a retail shelf but they nonetheless fill a demand niche:

- **Windows 7 Starter** is available only as a pre-installed operating system on netbook-class PCs. This edition is designed to run well with relatively low memory and disk space. It does not include some Windows 7 features such as 64-bit system support, the Windows Aero theme, or Windows domain support for business users. Because it's essentially a stripped down version of Windows 7 Home Premium, Windows 7 Starter is built mainly for mobile users who only need to browse the Internet, check e-mail, and use a word processor or spreadsheet program.
- **Windows 7 Home Basic** supports the Windows Aero theme but does not include all Aero features. This edition is not available to North American users or those in other "developed technology markets" (such as Australia, Western and Central Europe, Hong Kong, or Saudi Arabia). Microsoft controls the geographical restrictions through the activation process (discussed later in this lesson). If you attempt to activate a computer running Home Basic in a country or region that's restricted from use, the activation process fails.
- **Windows 7 Enterprise** is geared toward enterprise environments. This edition contains all of the same features as Windows 7 Ultimate, but unlike the Ultimate edition, it is not available to home users on an individual license basis. Enterprise is available only through special corporate licensing agreements. Companies must have a Software Assurance Agreement with Microsoft to purchase software licenses. As a result, it includes benefits that are unique to the Software Assurance program, such as allowing operation of diskless PCs (nodes) and running multiple virtual machines.

32-Bit Computing versus 64-Bit Computing

The terms 32-bit and 64-bit refer to the way a computer's central processing unit (CPU) processes data. One of the significant differences is that a 64-bit computer can use much more random access memory (RAM) than a 32-bit computer. Operating systems also come in 32-bit and 64-bit versions, and it's important to match the correct operating system to its corresponding computer processor.

More memory and a faster processor helps an operating system run more efficiently, especially when running multiple programs or graphics-intensive applications. The end user has a much better computing experience using a computer that has ample memory.

A **32-bit computer**, also designated as x86, can use up to 4 gigabytes (GB) of RAM. A **64-bit computer**, often designated as x64, can handle much more RAM—the maximum is limited by the computer's motherboard. For example, Windows 7 Home Premium supports up to 8 GB of memory, which is typically the maximum the motherboard supports on new computers designed for the Windows 7 Home Premium market. If you install Windows 7 Professional, Ultimate, or Enterprise on the same computer, although they support up to 192 GB of memory, the motherboard will still use only 8 GB even if you try to install more memory.

TAKE NOTE *

Some computers have a 64-bit-capable processor, which is a 32-bit processor that can run 64-bit user-mode code.

TAKE NOTE *

To check for the latest drivers, run Windows Update or go to Device Manager, double-click a specific hardware component, and click Update Driver on the Driver tab in the Properties dialog box. You can also visit the manufacturer's Web site and download the latest driver.

You can run a 32-bit operating system on a 64-bit computer, but you generally cannot run a 64-bit version of Windows on a 32-bit computer. (There are exceptions but they rarely apply nowadays.) In addition, a 64-bit computer requires 64-bit drivers for all of the hardware components. If you run a mix of 32-bit and 64-bit systems in an enterprise environment, you will need both types of drivers for networked printers, scanners, projectors, and other shared devices. You will also need to maintain multiple images—at least one image for the 32-bit computers and one for the 64-bit computers. An **image** is an exact replica of a computer system. You can use an image to quickly install an operating system with applications to a computer or to restore a crashed computer. You'll learn about images later in this lesson and in Lesson 8.

Finally, many computers today have multi-core processors. A 32-bit version of Windows 7 supports up to 32 processor cores; a 64-bit version of Windows 7 supports up to 256 processor cores.



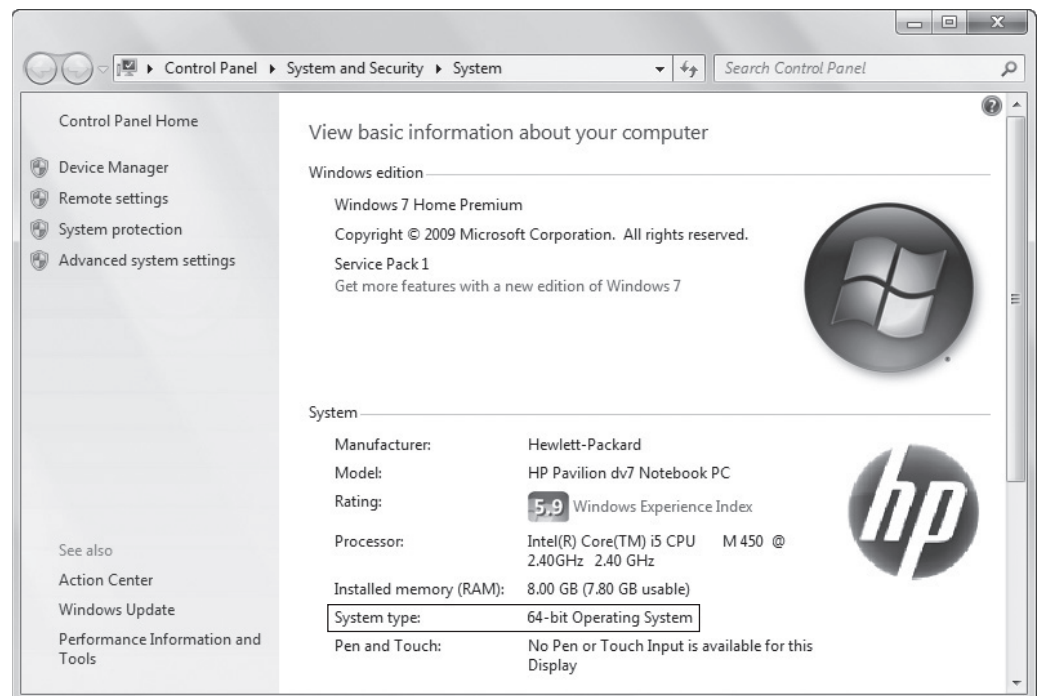
DETERMINE IF YOUR PC IS RUNNING 32-BIT WINDOWS OR 64-BIT WINDOWS

GET READY. To find out if your computer is running a 32-bit or 64-bit version of Windows 7 or Windows Vista, perform the following steps:

1. Click the **Start** button, right-click **Computer**, and then click **Properties**. The System window displays.
2. Look in the System area to view the system type (see Figure 1-1).

Figure 1-1

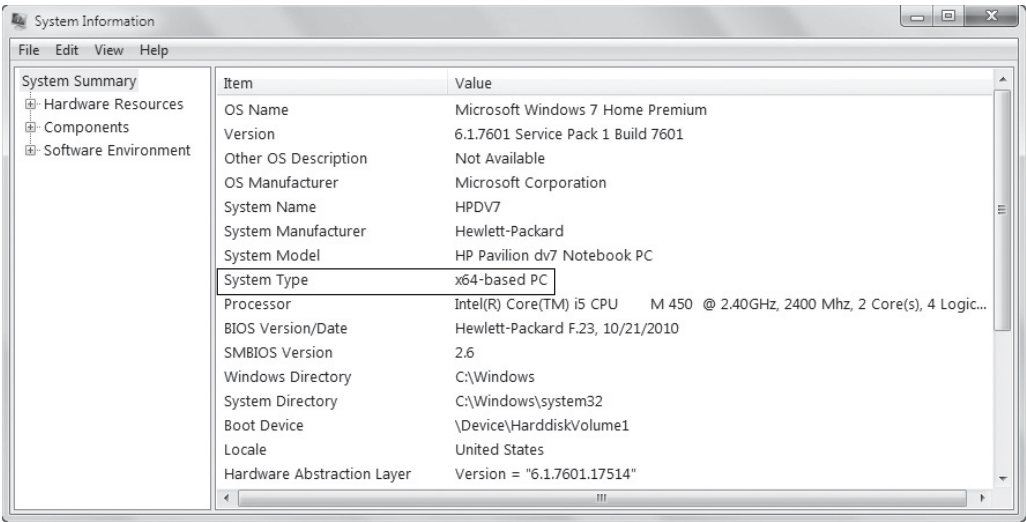
Viewing system information



An alternative method is to check the System Information window. To do so, perform the following steps:

1. Click the **Start** button, type **system info** in the **Search programs and files** search box, and then click **System Information** in the resulting list.
2. Make sure **System Summary** is selected in the navigation pane on the left.
3. Look at the **System Type** value in the right pane (see Figure 1-2):
 - **x86-based PC** displays for a 32-bit operating system
 - **x64-based PC** displays for a 64-bit operating system

Figure 1-2
Viewing the System Type value
on the System Information
page



To check the operating system version in Windows XP:

- 1. Click **Start**.
- 2. Right-click **My Computer** and choose **Properties**. If “x64 Edition” is not listed, you’re running the 32-bit version of Windows XP.

Windows 7 System Requirements

Software manufacturers, including Microsoft, list the system requirements needed to run their products. The specifications are usually minimum requirements; recommended requirements—which allow for much better performance of the OS and applications—are often much higher (in the case of memory, processor speed, or hard disk space) or involve more recent technology.

CERTIFICATION READY

What is the minimum amount of RAM a computer must have in order to run Windows 7 on a 32-bit processor?
2.1

According to Microsoft, a computer that will run Windows 7 must meet the following system requirements:

- 1 gigahertz (GHz) or faster 32-bit (x86) or 64-bit (x64) processor
- 1 gigabyte (GB) RAM (32-bit) or 2 GB RAM (64-bit)
- 16 GB available hard disk space (32-bit) or 20 GB (64-bit)
- DirectX 9 graphics device with Windows Display Driver Model (WDDM) 1.0 or higher driver

Hardware specifications usually mean the software will run but might not result in an optimal user experience. When preparing to run Windows 7, it’s best to exceed the processor, RAM, and hard disk space requirements, if possible. For example, a user who wants to simultaneously run a Web browser, an e-mail client, and productivity software (such as a word processor and a spreadsheet application) will have a good user experience on a computer with a 2 GHz processor, 4 GB of RAM, and at least a 250 GB hard drive. A user who needs to run memory-intensive graphic programs along with other applications will find the computer highly responsive with at least 8 GB of RAM and 500 GB or more of hard disk space. Computers that don’t have access to shared storage space on a network may also need secondary storage, such as an external flash hard drive. This is especially important if the user has a large number of image, video, or audio files, which tend to consume much more disk space than ordinary document files.

In addition, Microsoft lists the following items as required for using specific features or for optimal performance:

- Internet access (be aware that you may need to pay for the service)
- Additional memory and advanced graphics hardware for video playback, depending on the resolution required or desired
- A graphics card compatible with DirectX 10 or higher for certain games and programs; DirectX enhances the multimedia capabilities of a computer by enabling the graphics card to process some multimedia functions rather than the CPU.
- A TV tuner and additional hardware for some Windows Media Center functionality
- Specific hardware for Windows Touch and Tablet PCs
- A network and PCs running Windows 7 for HomeGroup utilization
- A compatible optical drive to burn DVDs/CDs
- Trusted Platform Module (TPM) 1.2 for BitLocker; TPM is a security chip on some motherboards that helps protect a computer from being used when the computer has been lost, stolen, or attacked by a hacker.
- A universal serial bus (USB) flash drive for BitLocker To Go
- An additional 1 GB of RAM and an additional 15 GB of available hard disk space for Windows XP Mode
- Audio output for music and sound

TAKE NOTE *

Remember, some features of Windows 7, such as BitLocker, do not ship with every version of Windows 7.

If you're not sure whether your computer will run Windows 7, see the "Using Windows 7 Upgrade Advisor" section in this lesson.

+ MORE INFORMATION

For more information about the Windows 7 system requirements, visit <http://windows.microsoft.com/en-US/windows7/products/system-requirements>

■ Identifying Upgrade Paths



THE BOTTOM LINE

Can you upgrade to Windows 7 from your current operating system? If so, what type of upgrade you can perform? Those answers depend on many factors. Learn about Windows 7 upgrade paths to fully understand your options.

CERTIFICATION READY

What type of upgrade path is necessary for upgrading from Windows Vista to Windows 7?

2.2

A retail version of Windows 7 is available as a full version or an upgrade version. You install the full version on a clean hard disk. You should purchase an upgrade version if your computer is currently running Windows XP or Windows Vista. The full and upgrade versions are essentially the same—they have the same features and integrated programs.

In the context of this lesson, an **upgrade path** is the set of options you have to upgrade from one Windows operating system to another. When upgrading to Windows 7 from Windows Vista, you have two primary choices: a standard upgrade or a custom installation. Windows XP users must perform a custom installation when "upgrading" to Windows 7.

An **upgrade installation** replaces your current version of Windows with Windows 7 while retaining your files, settings, and programs. This type of installation is sometimes called an "in-place" installation. A **custom installation** replaces your current version of Windows with Windows 7 but overwrites your files, settings, and programs. This is also referred to as a "clean" installation.

TAKE NOTE*

You can use the upgrade or full version of Windows 7 to perform either a custom or upgrade installation. Regardless of the type of installation you plan to perform, you should first back up the files and settings on the computer to be upgraded as a safety precaution. Backups are covered in Lesson 8.

Table 1-2 shows the upgrade paths to Windows 7 Home Premium, Professional, and Ultimate.

Table 1-2
Windows 7 Upgrade Paths for Home Premium, Professional, and Ultimate

UPGRADING FROM	TO HOME PREMIUM	TO PROFESSIONAL	TO ULTIMATE
Windows XP	Custom	Custom	Custom
Windows Vista Home Basic	Upgrade	Custom	Upgrade
Windows Vista Home Premium	Upgrade	Custom	Upgrade
Windows Vista Business	Custom	Upgrade	Upgrade
Windows Vista Ultimate	Custom	Custom	Upgrade

+ MORE INFORMATION

For more information about upgrading to Windows 7, visit <http://windows.microsoft.com/en-US/windows7/products/upgrade> and <http://windows.microsoft.com/en-US/windows7/upgrading-to-windows-7-frequently-asked-questions>

Upgrade Paths from Windows XP

You don't have a lot of choices when upgrading from Windows XP. However, you can ease the process by following a few tips.

To upgrade from Windows XP to Windows 7, you must perform a custom installation. Because your files, programs, and settings will be overwritten, *back up all of your data files first*. A best practice is to create at least two backups and test both of them before proceeding with the upgrade.

You should also ensure you have the original installation media or downloaded installation files for all of the programs you plan to install after you upgrade to Windows 7.

TAKE NOTE*

You may be able to use Windows Easy Transfer to “move” files and settings from Windows XP to Windows 7. See the “Using Windows Easy Transfer” section in this lesson.

Upgrade Paths from Windows Vista

The upgrade path you must take from Windows Vista to Windows 7 depends on some key factors—mainly your current edition of Windows Vista and the edition of Windows 7 you want to run. There are a few other considerations too, such as 32-bit versus 64-bit environment and desired language.

If you want to upgrade from Windows Vista to Windows 7, knowing which version of Windows 7 to select can be daunting. The type of installation you perform—custom or upgrade—will depend on the edition of Windows Vista you’re currently running and the edition of Windows 7 you want to install.

The main point to remember is that you can perform an upgrade installation if you’re installing an equivalent or higher edition of Windows 7. Otherwise, you must perform a custom installation. Refer back to Table 1-2 to see which editions of Windows Vista map to which editions of Windows 7.

Here are some other situations that require a custom installation:

- If you’re currently running a 32-bit version of Windows Vista and want to install a 64-bit version of Windows 7, or vice versa
- If you plan to use a different language in Windows 7 than the language you’re using in Windows Vista

Upgrading directly to Windows 7 from Windows Vista can be a relatively quick and easy task. Your files, settings, and programs are preserved, which means you can be productive soon after the installation completes. Because a custom installation doesn’t preserve your files, settings, and programs, you will need to spend some time installing programs and configuring Windows 7 after the upgrade.



UPGRADE FROM WINDOWS VISTA TO WINDOWS 7

GET READY. To perform an upgrade installation from Windows Vista, perform the following steps:

1. In Windows Vista, start the upgrade installation:
 - From a download:** Locate the Windows 7 installation file and double-click it.
 - From disc or USB flash drive:** Insert the disc into your computer. If Setup doesn’t start automatically, click **Start**, click **Computer**, double-click your disc or drive icon, and then double-click **setup.exe**.
2. On the Install Windows screen, click **Install now**.
3. On the Get important updates for installation screen, get the latest updates. Your computer must be connected to the Internet.
4. On the Please read the license terms screen, accept the license terms and click **Next**.
5. On the Which type of installation do you want? screen, click **Upgrade**.
6. Follow the instructions to finish installing Windows 7.

TAKE NOTE*

Once your computer restarts, you should check that your data files are accessible and that peripherals are working as expected. You may also want to personalize the desktop in Windows 7.

Upgrade Paths from Other Operating Systems

You can upgrade from one Windows 7 edition to an advanced edition fairly easily. Going from an old edition of Windows, such as Windows 95 or Windows 2000, to Windows 7 requires the purchase of a full version of Windows 7 and a custom installation.

To upgrade to Windows 7 from Windows 95 or Windows 2000, you need to purchase a full version of Windows 7 and perform a custom installation. You cannot “upgrade” from a non-Windows operating system such as UNIX, Linux, or Mac OS.

However, you can easily upgrade from one edition of Windows 7 to a more advanced edition using Windows Anytime Upgrade. Upgrading in this manner preserves your files, settings, and programs, so you can be up and running within minutes. Table 1-3 shows you the Windows 7 upgrade paths using Windows Anytime Upgrade.

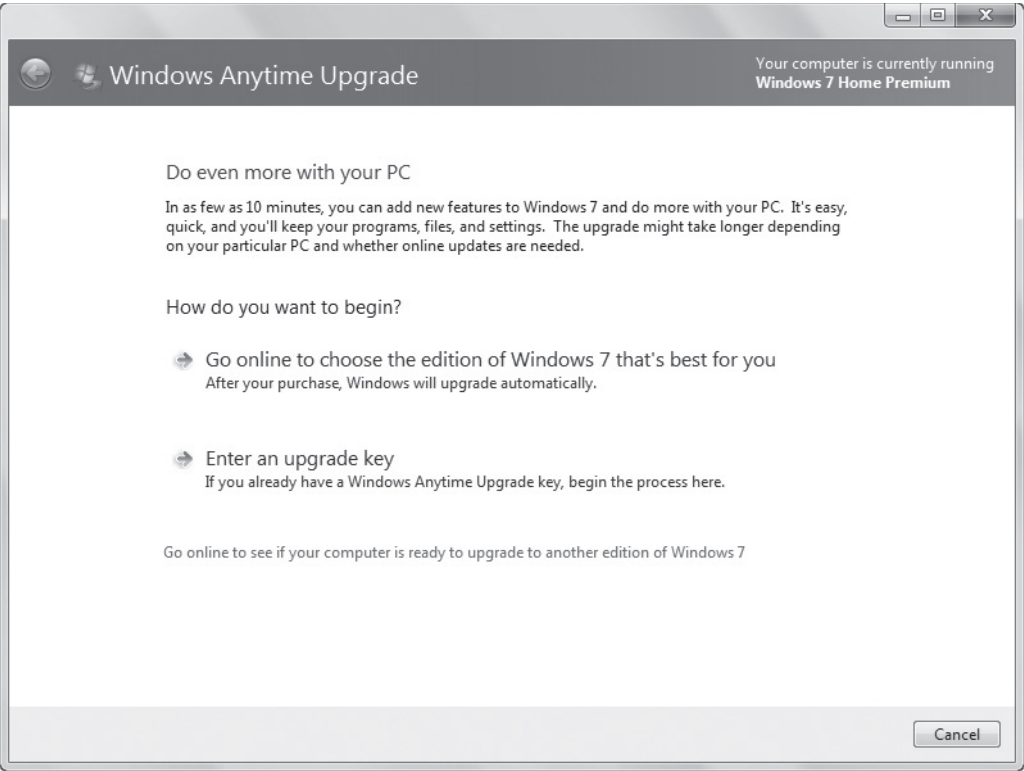
Table 1-3
Windows Anytime Upgrade Options

UPGRADE FROM	TO HOME PREMIUM	TO PROFESSIONAL	TO ULTIMATE
Windows 7 Starter	Yes	Yes	Yes
Windows 7 Home Premium	No	Yes	Yes
Windows 7 Professional	No	No	Yes

To perform this type of in-place upgrade, you must buy an upgrade key from Microsoft or your preferred retailer.

Windows Anytime Upgrade (see Figure 1-3) will upgrade a 32-bit version of Windows 7 to a 32-bit version of Windows 7 and a 64-bit version to a 64-bit version. You cannot use Windows Anytime Upgrade when going from a 32-bit to a 64-bit version or vice versa.

Figure 1-3
The Windows Anytime Upgrade main window



TAKE NOTE * Run Windows 7 Upgrade Advisor before purchasing an upgrade key to ensure your system is ready for the upgrade.

Once you install Windows 7 on a computer, all of the features for all editions of Windows 7 are stored on your computer. When you use Windows Anytime Upgrade to upgrade to an advanced edition of Windows 7, you are simply unlocking the features of that edition.

Using Windows 7 Upgrade Advisor

Windows 7 Upgrade Advisor helps you determine if your computer can run Windows 7, which editions and features will work, and whether your computer has any compatibility issues. You may download the utility for free from the Microsoft Web site at <http://windows.microsoft.com/en-US/windows/downloads/upgrade-advisor>

CERTIFICATION READY

What tool is used to check your computer's hardware, attached devices, and installed programs for compatibility issues with Windows 7?
2.1

If you've been running Windows Vista on your computer without any hardware problems, you'll probably be able to run Windows 7 too. The two operating systems run well on similar equipment. Upgrading from Windows XP to Windows 7 may result in more compatibility issues simply because the equipment may be older.

You should find out ahead of time if you need to upgrade hardware components or peripherals. **Windows 7 Upgrade Advisor** is a good preparation tool that checks your computer's hardware, attached devices, and installed programs for compatibility issues with Windows 7. The tool creates reports that list potential issues, such as an incompatible printer or a legacy application, and either recommends solutions or points to resources for further information. You also find out which version of Windows 7 is best for your computer.



INSTALL WINDOWS 7 UPGRADE ADVISOR

GET READY. To download and install Windows 7 Upgrade Advisor, perform the following steps:

1. Using a Web browser, go to the Windows 7 Upgrade Advisor Web page at <http://windows.microsoft.com/en-us/windows/downloads/upgrade-advisor>
2. Click the **Download** button to begin the download process. You may have to click two Download buttons on two different pages (just follow the on-screen instructions).
3. In the dialog box that displays, click **Save** and then save the setup file to a folder on your computer, such as the Downloads folder.
4. Open the folder and double-click **Windows7UpgradeAdvisorSetup.exe**.
5. If a Security Warning dialog box displays, click **Run** when prompted to start the installer.

TAKE NOTE *

If prompted to provide an administrator password or to click a button to continue, do so.

TAKE NOTE *

You might be prompted to install .NET Framework or another program before continuing. Click Yes to install the program and follow the prompts. If using Windows XP, you may need to log on as an administrator to complete the installation.

6. The Windows 7 Upgrade Advisor Setup Wizard starts. Accept the license terms and then click **Install**.
7. When the installation is complete, click **Close**.

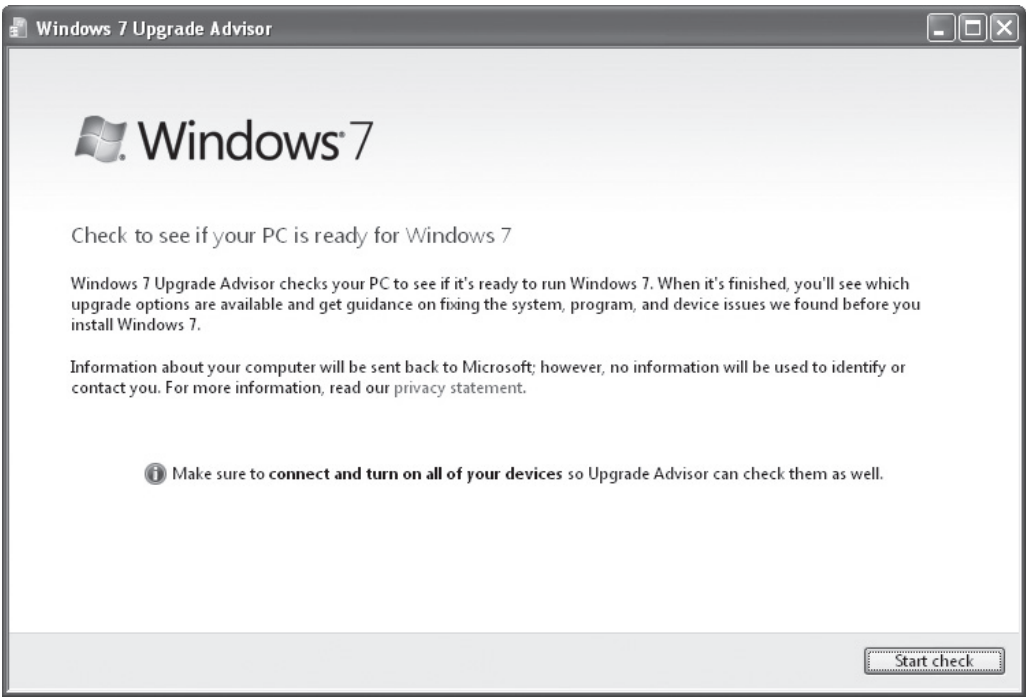


RUN WINDOWS 7 UPGRADE ADVISOR

GET READY. To run Windows 7 Upgrade Advisor and scan your computer for upgrade and compatibility issues, perform the following steps:

1. Plug in and power on external hard disks, printers, or any other peripheral devices that you use regularly with your computer.
2. Click **Start > All Programs > Windows 7 Upgrade Advisor**. The Windows 7 Upgrade Advisor window displays, as shown in Figure 1-4. (This example shows Windows 7 Upgrade Advisor running in Windows XP.)

Figure 1-4
The Windows 7 Upgrade Advisor window

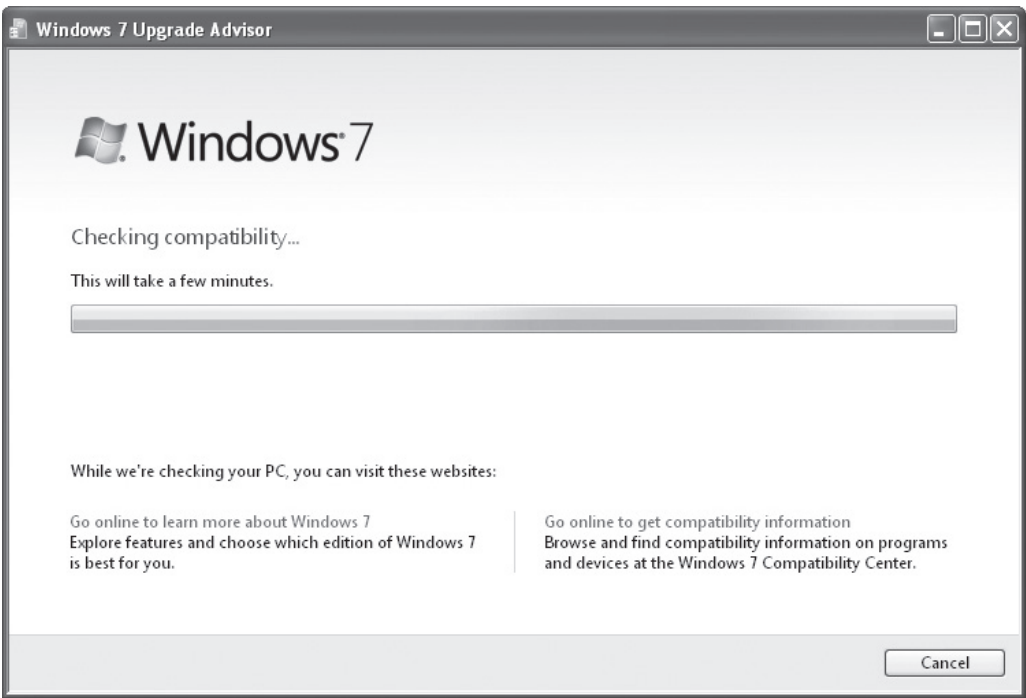


TAKE NOTE *

If prompted to provide an administrator password or to click a button to continue, do so.

- 3. Click the **Start check** button to begin the scan process.
- 4. While the Upgrade Advisor scans your computer, you can click the displayed links to learn more about Windows 7 and compatibility issues. See Figure 1-5.

Figure 1-5
Upgrade Advisor provides learning links while the scan is underway



5. When the scan is complete, Upgrade Advisor displays the results of the scan. Parts of an example report are shown in Figure 1-6 and Figure 1-7.

Figure 1-6

The results of an Upgrade Advisor scan (displaying software issues)

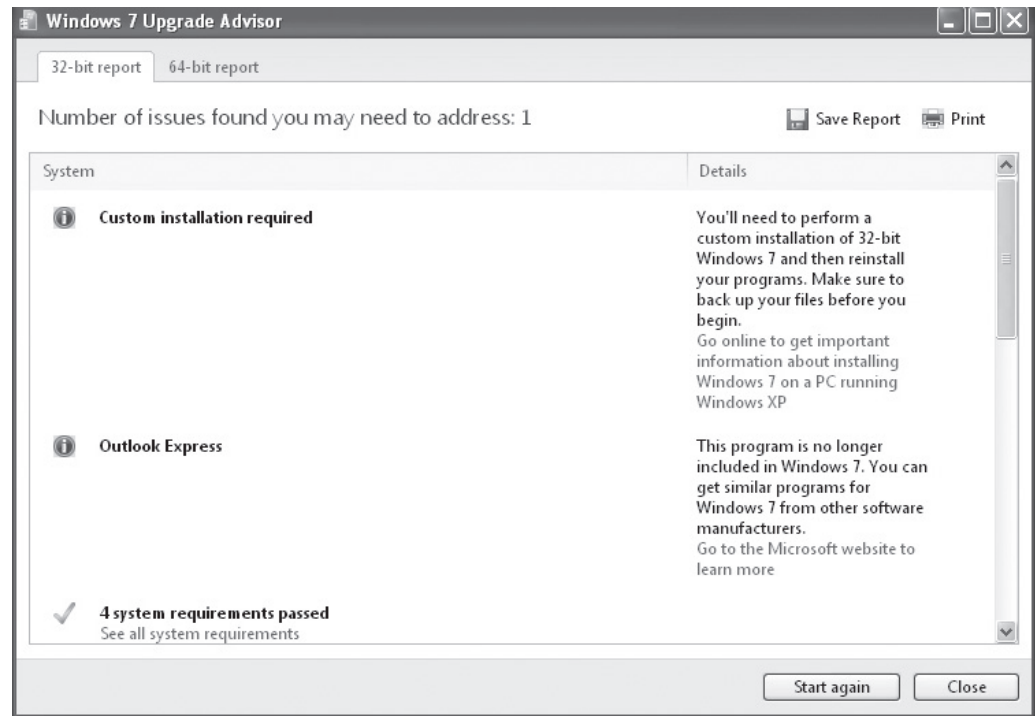
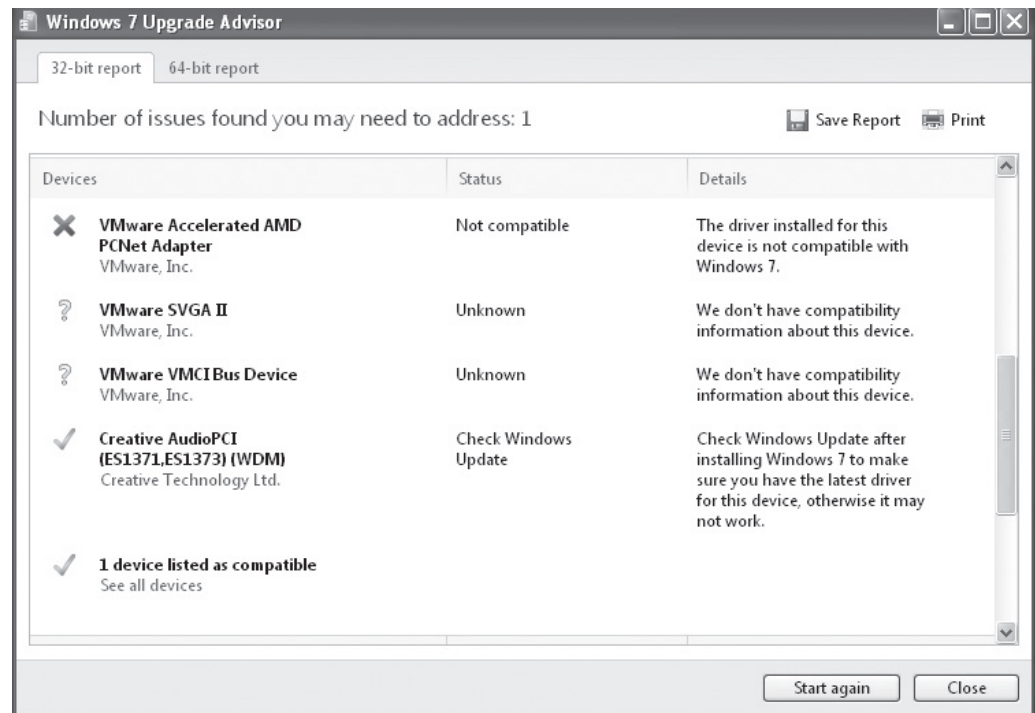


Figure 1-7

The results of an Upgrade Advisor scan (displaying device issues)



6. Click on any live links that appear in the window to see whether Upgrade Advisor has identified solutions to specific problems or to get more information about an action to be taken.

7. Print or save the list of the actions you must perform to install or upgrade Windows 7. To save the list, click the **Save Report** button.
8. In the **File name** text box, type a name for the report file and then click **Save**.
9. Click **Close** to close Upgrade Advisor.

Based on the results of the Windows 7 Upgrade Advisor scan, you should know which issues, if any, you'll encounter when you install or upgrade to Windows 7 on your computer.

MORE INFORMATION

For more information about Windows 7 Upgrade Advisor and to download the program, visit <http://windows.microsoft.com/en-US/windows/downloads/upgrade-advisor>

■ Identifying Application Compatibility



THE BOTTOM LINE

Operating system upgrades can result in one or more programs not working properly or not working at all. To identify and resolve issues, use the resources available at the Windows 7 Compatibility Center online as well as the Windows 7 Application Compatibility List for IT Professionals.

CERTIFICATION READY

What are two resources that help you identify and resolve application compatibility issues?

2.2

When you upgrade from one version of Windows to another (for example, from Windows XP or Windows Vista to Windows 7), the potential for *application compatibility* issues arises. Most programs will run fine in any of the operating systems, but some won't. For example, some programs might often crash or freeze, or they might not start at all.

TAKE NOTE *

Antivirus programs tend to be highly specific to operating system versions. You should usually upgrade your antivirus software when upgrading your operating system.

X REF

Windows XP Mode is built into some editions of Windows 7. It lets you run legacy programs in a virtual environment to avoid compatibility issues. You'll learn about Windows XP Mode in Lesson 2.

Two resources to help you identify and resolve application compatibility issues are the Windows 7 Compatibility Center and the Windows 7 Application Compatibility List for IT Professionals.

The Windows 7 Compatibility Center (see Figure 1-8) provides software programs, updates, downloads, drivers, and more that are compatible with Windows 7. Browse this site in advance of upgrading to Windows 7. You can also use this site to research software issues you encounter while using the Windows 7 Upgrade Advisor.

The Windows 7 Application Compatibility List for IT Professionals is a downloadable Microsoft Excel spreadsheet that lists commonly used programs, whether they are 32-bit or 64-bit, and information on compatibility. You can download this spreadsheet at <http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=2394>. Much of the information in the spreadsheet is a result of the Windows 7 Logo Program, which tests software to determine if it meets Windows 7 requirements.

Figure 1-8

The Windows 7 Compatibility Center web site



+ MORE INFORMATION

For more information about application compatibility with Windows 7, visit the Windows 7 Compatibility Center at <http://www.microsoft.com/windows/compatibility/windows-7/en-us/default.aspx>. The Windows 7 Application Compatibility List for IT Professionals may be downloaded from <http://www.microsoft.com/download/en/details.aspx?displaylang=en&id=2394>

■ Understanding Product Identification Keys



THE BOTTOM LINE

A product key is essential to installing any Windows operating system. This digital key ensures you have a legal installation of the Windows software.

CERTIFICATION READY

What term is used to describe a unique, alphanumeric code required by many software programs during installation?

2.3

The product identification key, often called a **product key** or **CD key**, is a unique, alphanumeric code required by many software programs during installation. The purpose of a product key is to help avoid illegal product installations. The product key you enter during Windows 7 installation is checked by Microsoft for legitimacy and whether it is already being used on a different computer.

TAKE NOTE *

When you buy a retail copy of Windows 7, 32-bit and 64-bit versions are included on the same installation media. The product key you enter during setup determines which version of Windows 7 is installed.

A Windows 7 product key looks similar to xxxxx-xxxxx-xxxxx-xxxxx-xxxxx, but is composed of letters and numbers. It is usually located:

- On the installation disc holder inside the Windows package
- On a sticker on the back or bottom of your computer if the operating system came pre-installed on the computer
- In a confirmation e-mail if you purchased and downloaded Windows 7 online

During installation, you must enter the product key exactly as printed. (If you are off by even one character the installation fails.) After you enter the product key correctly, the product key is then written to the Windows registry in an encrypted format, making it unreadable for security purposes. Therefore, it's important to keep your Windows 7 installation media and printed product key in a safe location after initial installation, in case you need to reinstall or repair the operating system at some point.

If you lose your product key, contact Microsoft to request a replacement key.

After a certain period of time post-installation, you will need to activate Windows 7 to continue using the operating system.

TAKE NOTE *

You can use the same product key to install Windows on many different computers. However, to meet legal requirements, you won't be able to activate Windows on more than one computer at a time or for the number of computers for which you own Windows licenses. Other software companies, such as Adobe, use this method of product control as well.

Activating Windows 7

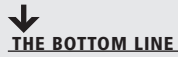
Microsoft uses activation to prevent the use of counterfeit copies or otherwise illegal use of its software products, including Windows 7. You must activate Windows 7 within 30 days of installation.

Activation is the process of verifying that your copy of Windows is genuine and that it is not in use on other computers than the number for which you own a license. If you purchased a single copy of Windows 7 from a retailer, for example, you can activate the software on only one computer at a time. Within 30 days of installing Windows 7, activate the software over the Web or by calling Microsoft. Once your Windows 7 installation is activated, you can use all features of the operating system.

If you installed Windows 7 on another computer, you must deactivate it on the original computer before activating it on the other computer. Deactivation may require a call to Microsoft Technical Support.

Registration is different from activation. You *must* activate an installation of Windows 7 but registration is optional. During registration, you give your contact information to Microsoft to sign up for technical support and other benefits.

■ Understanding Installation Types



There are many different types of Windows 7 installations, from the manual DVD method to a fully automated setup effort over a network. Learn the various ways in which you can install Windows 7 and select the most efficient method for your needs.

CERTIFICATION READY

What is a cloud installation?

2.3

CERTIFICATION READY

What are the types of removable media installations?

2.3

TAKE NOTE *

An image file is an exact replica of the contents of a hard disk, saved to a file with an .iso extension, or a .wim extension if it's a Windows Imaging Format image.

TAKE NOTE *

For more information on building a WinPE image, visit [http://technet.microsoft.com/en-us/library/dd799244\(WS.10\).aspx](http://technet.microsoft.com/en-us/library/dd799244(WS.10).aspx)

Microsoft provides many different ways to install Windows 7, from manual methods like inserting a DVD to fully automated, “non-touch” installations performed over a network or even via the cloud. (The **cloud** generally refers to the Internet or to a server accessible over the Internet.) The method you choose depends mainly on the number of computers on which you need to install Windows and how much time you have to devote to the project.

Installing Windows 7 from removable media is common in smaller enterprise or home environments. When you think of removable media, you might think of DVDs, but many installations are performed from USB drives as well. Using a DVD or USB drive is considered a manual method of installation. If you're installing Windows on one, two, or even 10 computers, a manual method works well. If you must install Windows on many computers, you'll want to understand automated methods, in order to save time (and, thus, money).

The following are categories that correspond to the level of interaction required during an installation:

- High Touch Installation (HTI)
- Lite Touch Installation (LTI)
- Zero Touch Installation (ZTI)

High Touch Installation (HTI) may include retail media or a standard image (ISO file). Using this method, you use an installation DVD or USB drive and manually install the operating system on every computer. You must then also manually configure each system.

In a larger environment, where you have, say, 25 or more computers that require Windows 7 installations, you could use a tool called ImageX to create bootable media. The Windows Automated Installation Kit (AIK) includes ImageX. You would perform these general steps:

1. Install Windows 7 on a clean hard disk.
2. Configure it with settings that will apply to all computers.
3. Use the Sysprep utility to create an image of the installation.
4. Boot to the Windows Preinstallation Environment (WinPE) and use ImageX to save the image to a DVD, a USB drive, or whatever type of media you plan to use.
5. Install the image on the remaining computers.

Lite Touch Installation (LTI) requires some human intervention in the early phase of the installation, but is automated (or unattended) from that point on. This installation method works well in environments with more than 150 computers.

You need the Windows AIK, Windows Deployment Services, and the Microsoft Deployment Toolkit 2010 for LTIs. **Windows Deployment Services** is a server role for Windows Server 2008 or Windows Server 2008 R2. It allows a user to press the F12 key, log on, and select an image for installation. After that, the installation can be automated. For example, you can use an answer file to configure Windows settings during installation. The answer file contains all the settings that are required for an unattended installation. The Microsoft Deployment Toolkit 2010 is a free download used to automate high-volume operating system deployments.

Zero Touch Installation (ZTI) is a fully automated, “touchless” method of installing Windows. You need System Center Configuration Manager (SCCM) for ZTIs. You use SCCM to deploy and update servers, client computers, and all kinds of devices on a network.

The ZTI method is geared for environments with more than 500 computers, involves a fairly steep learning curve, and requires a considerable budget compared to HTIs.

TAKE NOTE *

Another form of automated installation is to use a cloud service such as Windows Intune. This particular service is geared toward business environments and enables you to manage and secure networked computers. In addition, you can upgrade client computers to Windows 7 Enterprise Edition. You need a Web browser and Internet connection along with appropriate licensing to deploy Windows 7 Enterprise Edition via Windows Intune.



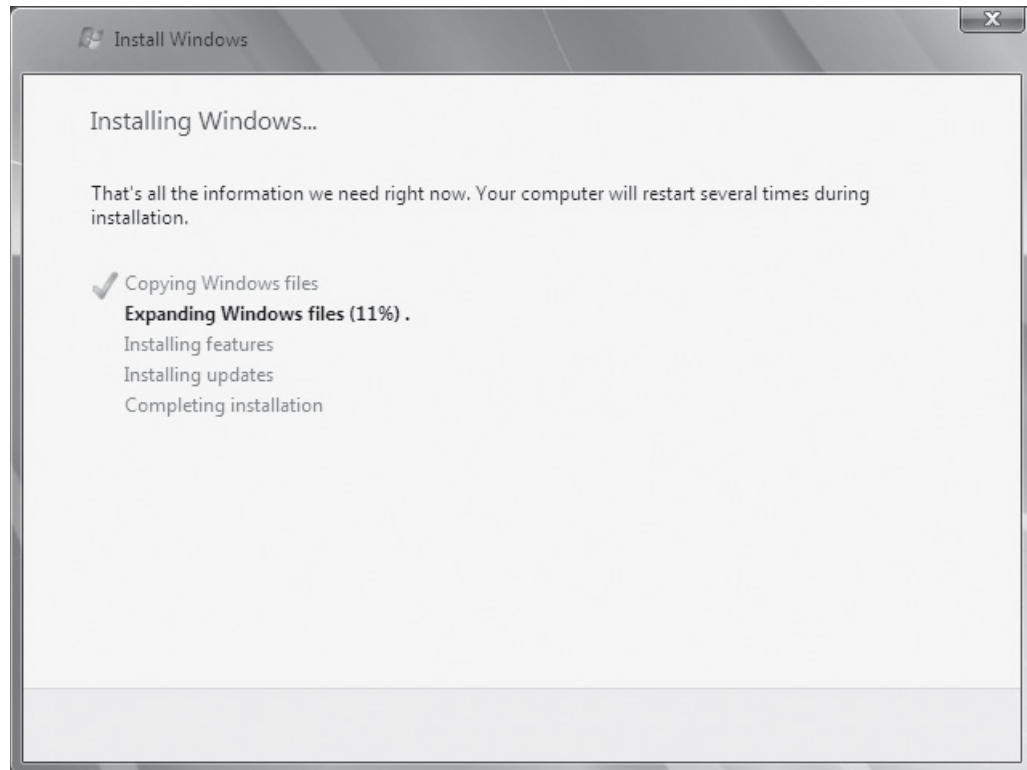
INSTALL WINDOWS 7

GET READY. There are many ways to install Windows 7. This exercise shows you how to install Windows 7 from removable media. Perform the following steps:

1. Turn on your computer and start the installation:
 - From a download:** Locate the Windows 7 installation file and double-click it.
 - From disc or USB flash drive:** Insert the disc into your computer. If Setup doesn't start automatically, click the **Start** button, click **Computer**, double-click your disc or drive icon, and then double-click **setup.exe**.
2. On the Install Windows screen, click **Install now**. The installation program shows you its progress as it install files (see Figure 1-9).

Figure 1-9

The Install Windows screen

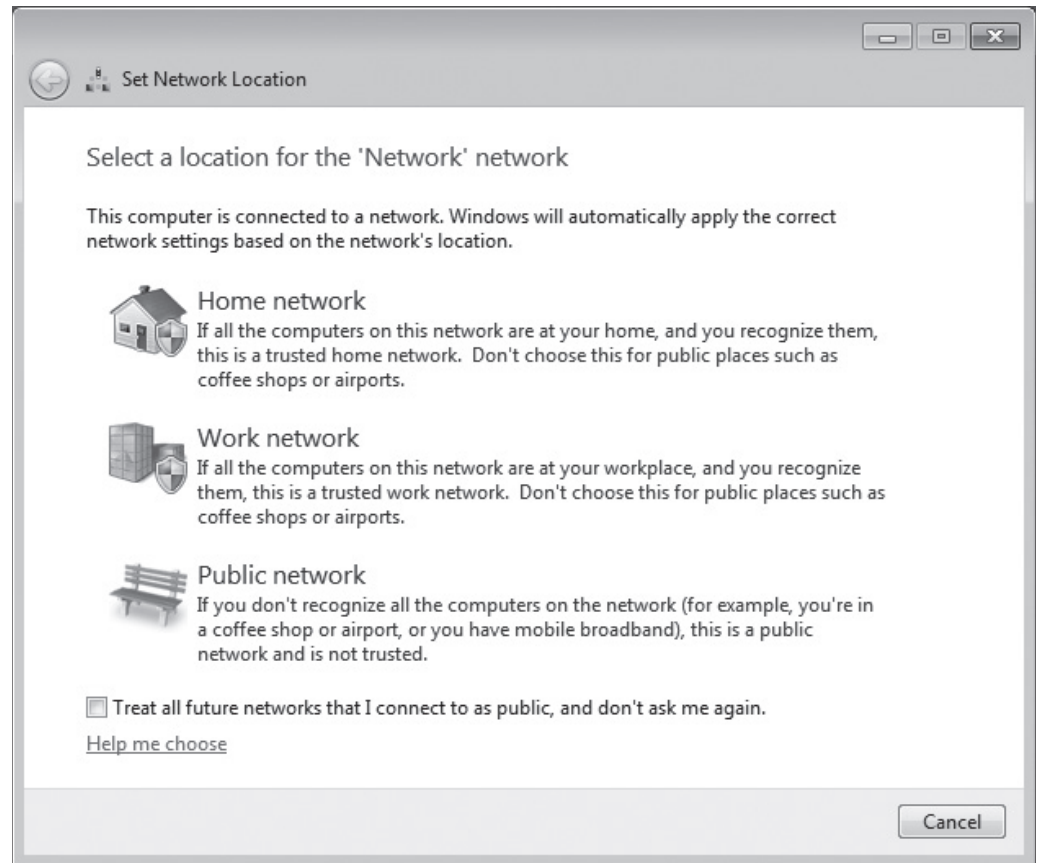


3. On the Get important updates for installation screen, if you have a live Internet connection, choose to get the latest updates to protect your PC.
4. On the Please read the license terms screen, accept the license terms and click **Next**.
5. On the Which type of installation do you want? screen, click **Custom**.

6. On the Where do you want to install Windows? screen, choose the partition that contains your previous version of Windows. Click **Next**.
7. In the Windows.old dialog box, click **OK**.
8. Follow any instructions and respond to prompts that appear, such as for naming your computer, creating a user account, and selecting a type of network (see Figure 1-10).

Figure 1-10

Selecting a type of network



Be sure to run Windows Update immediately after installing Windows 7.

TAKE NOTE *

For more information on installing Windows 7, visit <http://windows.microsoft.com/en-US/windows7/Installing-Windows-7-recommended-links> and <http://windows.microsoft.com/en-US/windows7/Installing-and-reinstalling-Windows-7>

Using Windows Easy Transfer

Windows Easy Transfer helps you move files and settings from one computer running Windows to another. The “move” can occur on the same computer if you’re upgrading to a different version of Windows that requires a custom installation. Either way, by transferring your files and settings, you get a jump start on your productivity.

If you’ve used your computer for a long time, you’ve probably accumulated hundreds or thousands of files, especially if you take photos or collect digital music. You’ve also, over time, tweaked user settings so they’re most efficient for accomplishing work and running software. You shouldn’t have to lose files or settings—and your efforts—to upgrade to Windows 7.

Use *Windows Easy Transfer* to save your files and settings on an external hard drive, and then “transfer” them to the new installation of Windows 7. You cannot transfer your programs, so make sure you have the original installation media so you can manually install them in Windows 7.

TAKE NOTE *

For more information on Windows Easy Transfer, visit <http://windows.microsoft.com/en-US/windows7/transfer-files-and-settings-from-another-computer>

**USE WINDOWS EASY TRANSFER**

GET READY. This exercise uses Windows XP as the example operating system. To perform the transfer with an external hard drive, perform the following steps:

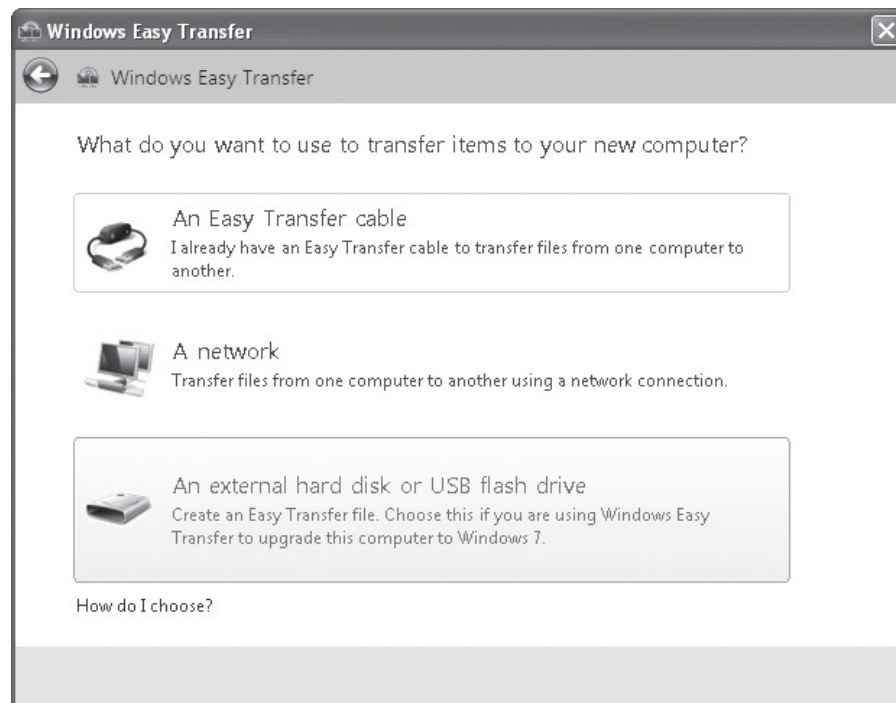
1. Download the latest Windows Easy Transfer program from Microsoft.com and install it on your computer.
2. Reboot your computer and log on as an administrator. Make sure no programs are running.
3. Click the **Start** button, click **All Programs**, and then click **Windows Easy Transfer for Windows 7**. The Windows Easy Transfer Wizard starts.
4. Read the information on the opening screen, and then click **Next**.
5. Select a transfer method (see Figure 1-11). For this example, click **An external hard disk or USB flash drive**.

TAKE NOTE *

If prompted to provide an administrator password or to click a button to continue, do so.

Figure 1-11

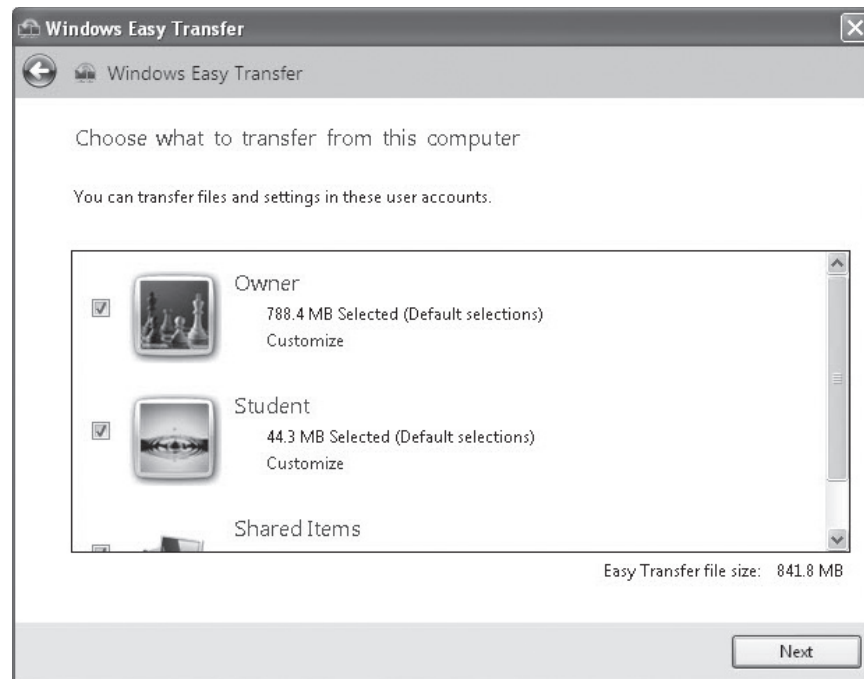
Selecting a transfer method



6. On the next screen, select **This is my old computer. I want to transfer files and settings from this computer**.
7. Windows Easy Transfer checks all user accounts, then displays a summary of what can be transferred (see Figure 1-12). Click **Next**.

Figure 1-12

Viewing content that can be transferred



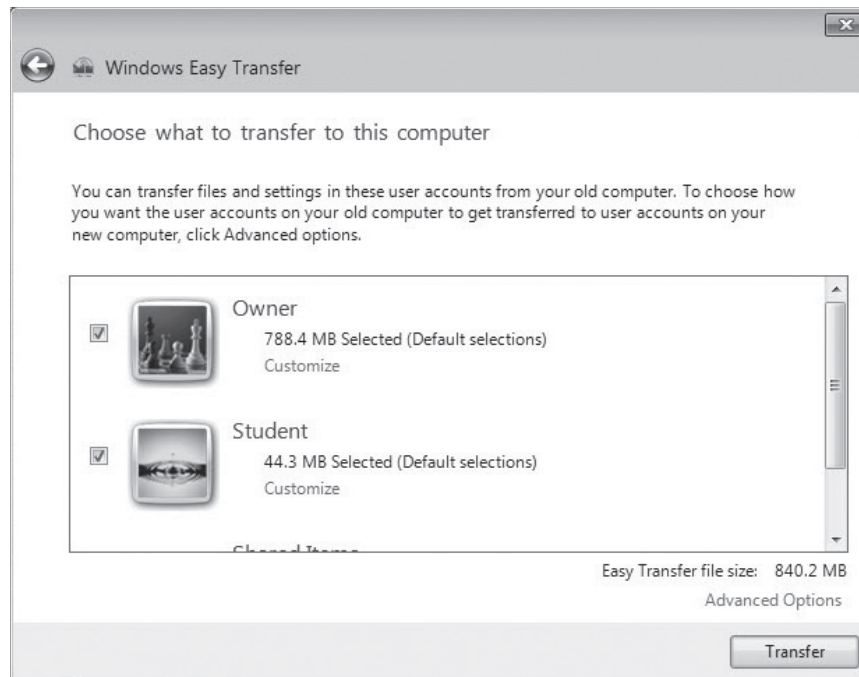
8. On the next screen, Windows Easy Transfer states it will save all files and settings to an Easy Transfer file. If you want to include a password, type it now. Otherwise, just click **Save**.
9. The Save your Easy Transfer file window displays. Select the external drive you are using for the transfer and click **Save**. A file with a .MIG extension is saved to the location you selected. The Save process may take several minutes or hours, depending on the amount of content you are transferring.
10. When the file is saved, click **Next**.
11. The Your transfer file is complete screen displays. Write down the location of the transfer file on your external drive. Click **Next**.
12. The Windows Easy Transfer is complete on this computer screen displays. Click **Close**.

After you install Windows 7 on the computer, perform the following steps:

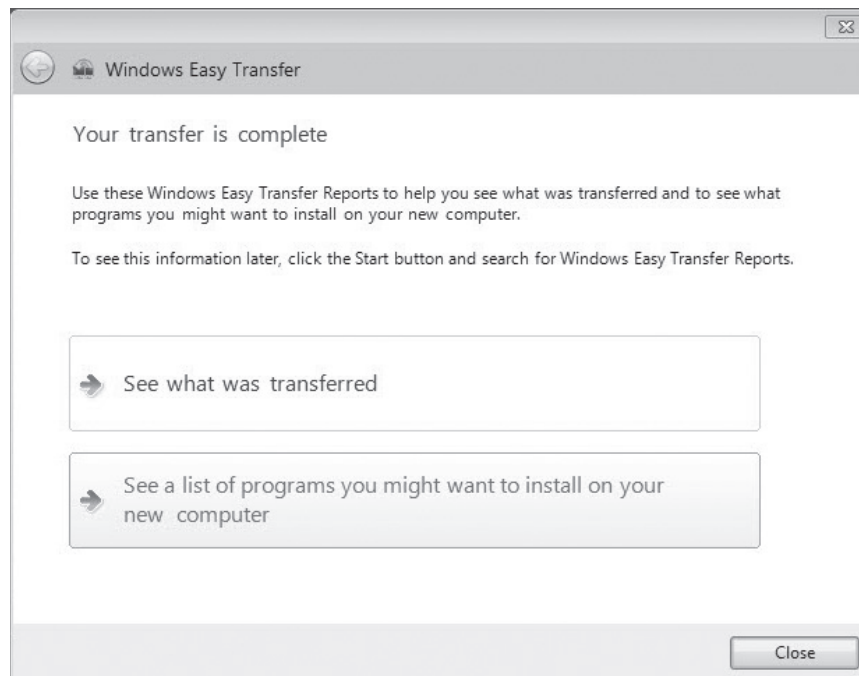
1. Log on as an administrator and close any open programs.
2. Connect the external drive to your PC. You should be prompted to run Windows Easy Transfer. If not, open Windows Explorer, browse to your external drive, and then double-click the .MIG file. Windows Easy Transfer starts. If the program detects any open programs, it prompts you to close them. Click **Close all**.
3. The Choose what to transfer to this computer screen displays (see Figure 1-13). All items are checked by default. Uncheck any items you don't want transferred (if any) and click **Transfer**.
4. If you chose to password-protect your .MIG file, enter the password when prompted. The transfer process may take several minutes or several hours, depending on the amount of content you are transferring. A progress screen indicates at what stage the transfer is at. Do not close the window until the transfer is complete.
5. The Your Transfer is complete screen displays. To view the transferred files in Windows 7, click **See what was transferred** (see Figure 1-14).

Figure 1-13

Choosing what to transfer to the computer running Windows 7

**Figure 1-14**

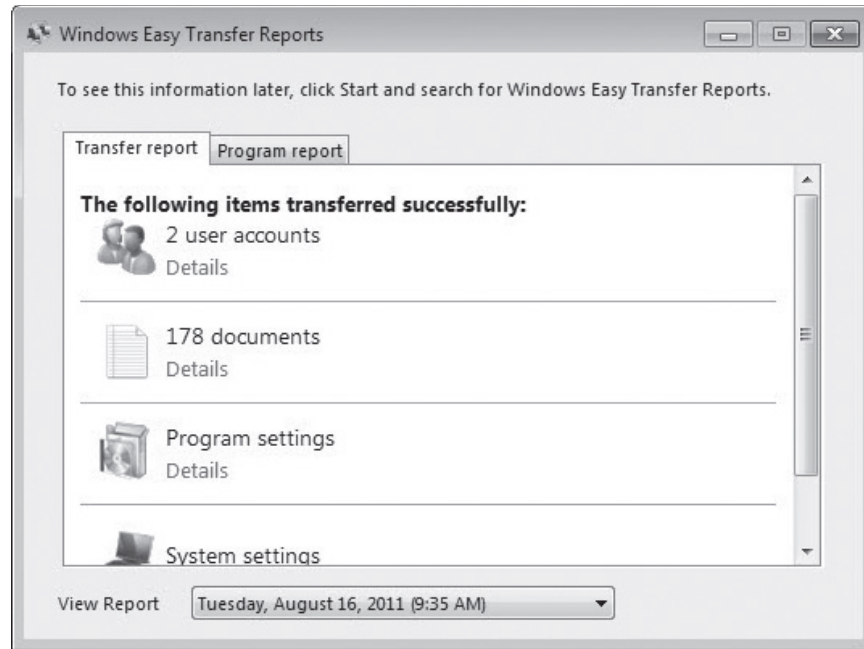
The Your Transfer is complete screen



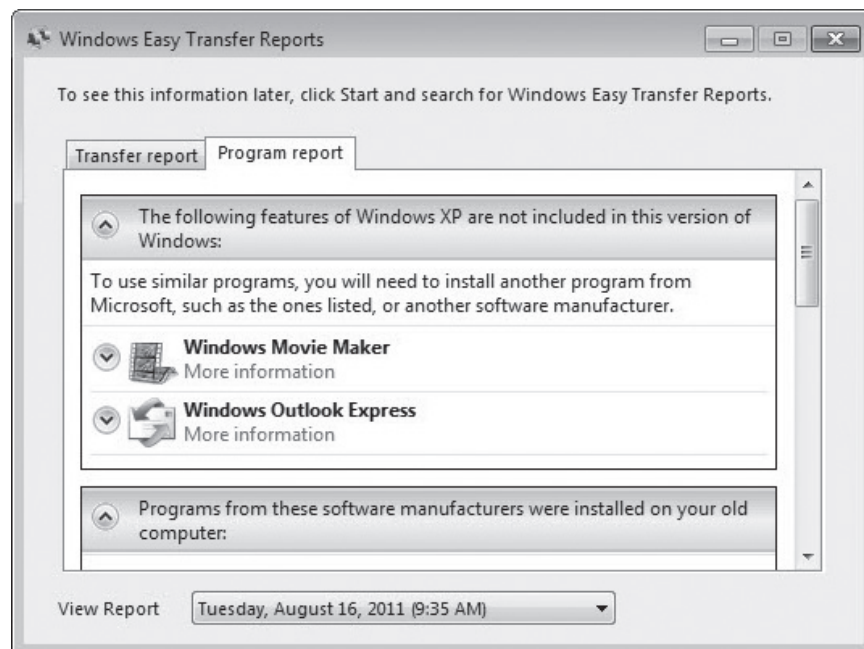
6. The Windows Easy Transfer Reports window displays with the Transfer report tab displayed (see Figure 1-15). Browse the list and click **Details** in any of the categories for more information. Click the Close icon (X) in the upper-right corner when you're done.
7. Windows Easy Transfer remembers the programs you used previously and recommends those that should run in Windows 7. Click **See a list of programs you might want to install on your new computer**. The Windows Easy Transfer Reports window reappears, with the Program report tab displayed (see Figure 1-16). Browse the list of programs and note the recommendations. Click the **Close** icon in the upper-right corner.

Figure 1-15

The Transfer report tab

**Figure 1-16**

The Program report tab



8. To end Windows Easy Transfer, click **Close**.
9. You're prompted to restart your computer. Click **Restart now** or **Restart later**.

The steps in this procedure will vary if you select different options; however, the basic process is the same.

SKILL SUMMARY

IN THIS LESSON YOU LEARNED:

- Windows 7 is a desktop operating system that improves on many aspects of its direct predecessors, Windows Vista and Windows XP.
- Windows 7 includes several new features, such as large and animated task thumbnails, homegroups, Jump Lists, libraries, and Windows XP Mode.
- The six main editions of Windows 7 are Starter, Home Basic, Home Premium, Professional, Ultimate, and Enterprise.
- Common computer architectures are 32-bit and 64-bit. A 32-bit computer can address up to 4 GB of RAM. A 64-bit computer can use much more RAM than a 32-bit computer. Operating systems also come in 32-bit and 64-bit versions, and it's important to match the correct operating system to the computer processor.
- You can run a 32-bit operating system on a 64-bit computer, but you generally cannot run a 64-bit version of Windows on a 32-bit computer.
- The main system requirements for running Windows 7 are: 1 GHz or faster 32-bit (x86) or 64-bit (x64) processor, 1 GB RAM (32-bit) or 2 GB RAM (64-bit), 16 GB available hard disk space (32-bit) or 20 GB (64-bit), and a DirectX 9 graphics device with Windows Display Driver Model (WDDM) 1.0 or higher driver.
- Windows 7 Upgrade Advisor helps you determine if your computer can run Windows 7, which editions and features will work, and whether your computer has any compatibility issues.
- The Windows 7 Compatibility Center provides software programs that are compatible with Windows 7, including updates, downloads, drivers, and more.
- An upgrade installation replaces your current version of Windows with Windows 7 while retaining your files, settings, and programs. A custom installation replaces your current version of Windows with Windows 7 but overwrites your files, settings, and programs. A custom installation is also referred to as a clean installation.
- The upgrade path you must take from Windows Vista to Windows 7 depends on some key factors, mainly your current edition of Windows Vista and the edition of Windows 7 you want to run. There are a few other considerations too, such as 32-bit versus 64-bit environment and desired language. You can easily upgrade from one edition of Windows 7 to a more advanced edition using Windows Anytime Upgrade.
- Installation methods fall into three main categories: High Touch Installation (HTI), Lite Touch Installation (LTI), and Zero Touch Installation (ZTI). HTI is mostly manual, and ZTI is almost completely automated.
- Windows Easy Transfer helps you move files and settings from one computer running Windows to another, or to a new installation of Windows 7 on the same computer.

■ Knowledge Assessment

Fill in the Blank

Complete the following sentences by writing the correct word or words in the blanks provided.

1. A(n) _____ is the set of options you have to upgrade from one Windows operating system to another.
2. _____ is the process of verifying that your copy of Windows is genuine and that it is not in use on more computers than the number for which you own licenses.

3. A _____-bit computer is also designated as x86.
4. A(n) _____ installation replaces your current version of Windows with Windows 7 while retaining your files, settings, and programs.
5. The _____ method involves manual installation of Windows 7 from media such as a DVD or USB drive.
6. Windows 7 _____ is targeted mainly toward small business users.
7. Windows 7 _____ is a retail version that includes BitLocker and AppLocker.
8. _____ is a fully automated, touchless method of installing Windows.
9. _____ is a server role for Windows Server 2008 or Windows Server 2008 R2 that allows for mostly automated installation of Windows 7 over a network.
10. To use Windows Anytime Upgrade to perform an in-place upgrade, you must buy an _____ from Microsoft or your preferred retailer.

Multiple Choice

Circle the letter that corresponds to the best answer.

1. Which edition of Windows 7 does *not* support x64 CPUs?
 - a. Starter
 - b. Home Basic
 - c. Home Premium
 - d. Professional
2. Which editions of Windows 7 are widely available in the retail sector? (Choose all that apply.)
 - a. Home Premium
 - b. Professional
 - c. Ultimate
 - d. Enterprise
3. Which edition of Windows 7 requires a Software Assurance Agreement with Microsoft?
 - a. Home Premium
 - b. Professional
 - c. Ultimate
 - d. Enterprise
4. Which of the following features is *not* included in Windows 7 Professional?
 - a. Encrypting File System
 - b. Windows XP Mode
 - c. Support for joining domains
 - d. BitLocker
5. Which tool scans your computer and produces a report of any Windows 7 compatibility issues with your computer?
 - a. Windows 7 Compatibility Center
 - b. Windows 7 Upgrade Advisor
 - c. Windows Easy Transfer
 - d. Windows Anytime Upgrade
6. Which Windows 7 installation method uses System Center Configuration Manager for deployment across a network?
 - a. HTI
 - b. LTI
 - c. ZTI
 - d. Windows Anytime Upgrade

7. Which Windows 7 installation method requires some human interaction but uses Windows Deployment Services to automate most of the installation?
 - a. HTI
 - b. LTI
 - c. ZTI
 - d. Windows Anytime Upgrade
8. You can use the upgrade installation method when upgrading from Windows Vista Business to which of the following? (Choose all that apply.)
 - a. Windows 7 Home Basic
 - b. Windows 7 Home Premium
 - c. Windows 7 Professional
 - d. Windows 7 Ultimate
9. What are two common methods for determining if your computer is running a 32-bit or 64-bit version of Windows 7 or Windows Vista? (Choose all that apply.)
 - a. Run Windows 7 Upgrade Advisor.
 - b. Open the Computer window.
 - c. Open the System window.
 - d. Run the System Information utility.
10. Where might a Windows 7 product key be located? (Choose all that apply.)
 - a. On the installation disc holder inside the Windows package
 - b. On a sticker on the back or bottom of your computer
 - c. On the installation media itself
 - d. In a confirmation e-mail if you purchased and downloaded Windows 7 online

True / False

Circle *T* if the statement is true or *F* if the statement is false.

- | | | |
|---|---|---|
| T | F | 1. You must perform a custom installation to upgrade from Windows XP to Windows 7. |
| T | F | 2. A 1 GHz or faster 32-bit (x86) processor is required to run Windows 7. |
| T | F | 3. You must register Windows 7 to run it. |
| T | F | 4. The purpose of a Windows 7 product key is to help avoid illegal installations. |
| T | F | 5. The Windows 7 Logo Program tests software to determine if it meets Windows 7 requirements. |

■ Competency Assessment

Scenario 1-1: Troubleshooting a Compatibility Problem

A remote employee reports that after he upgraded his computer to Windows 7, he is unable to use his USB printer. He says Windows 7 hangs whenever he plugs in his printer. How do you respond?

Scenario 1-2: Creating a Plan to Upgrade to Windows 7

The IT manager for your company informs you that senior management approved the budget for upgrading 20 networked client computers from Windows Vista Business to Windows 7. He asked you how to determine whether the computers can be upgraded to Windows 7 Professional, and which installation method will be most efficient and cost-effective. How do you answer?

■ Proficiency Assessment

Scenario 1-3: Converting a Small Office to Windows 7

Danielle provides IT support for Swish It Away, a small cleaning service in the Pacific Northwest. The company has eight computers. Four of the computers run Windows XP Professional Edition and the other four run Windows Vista Business Edition. The company president has asked her to make sure all eight computers are running Windows 7 Professional by the beginning of the next quarter. What type of installations must Danielle perform, and which additional steps (if any) must Danielle take to retain the users' files and settings?

Scenario 1-4: Selecting the Right Computer and Operating System

Swish It Away is beginning to grow. The president now wants Danielle to acquire computers for three new staff members. Randi has been hired as the president's personal assistant and will need to run a word processor, spreadsheet application, a Web browser, and an e-mail client. Pooja will provide marketing and graphics services, such as press releases, brochures, flyers, advertisements, and graphics for the new Web site. Stan is the new salesperson who will travel locally each day. When he's in the office, he will share a desktop computer with another salesperson, but Stan needs to be able to check e-mail and access the Internet while he's out of the office. What computer specifications should Danielle look for, and which editions of Windows 7 should run on each computer?